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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/576,113	05/22/2000	Marijn E. Brummer	5543-5	2804

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EXAMINER

LU, TOM Y

ART UNIT	PAPER NUMBER
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2621

DATE MAILED: 02/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/576,113

Applicant(s)

BRUMMER, MARIJN E.

Examiner

Tom Y Lu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 December 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 6-17 is/are rejected.
- 7) ☒ Claim(s) 2-5 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. The amendment and written response filed on December 08, 2003 has been entered.
2. Claims 1-17 are pending.

Response to Arguments

3. Applicant's arguments filed on December 08, 2003 have been fully considered but they are not persuasive.

The Pieper Reference:

Applicant argues the examiner has misinterpreted the Pieper patent with the respect to the scope of the claimed invention. The Pieper patent relates to viewing and manipulating tomographic images after they are scanned by an imaging device and does not relate to a device for acquiring additional image data. In addition, applicant argues the Pieper patent does not teach or suggest, as recited in Claim 1 and representative of Claims 8 and 14, a 3-D model device in communication with an imaging device such that an operator may define scan geometry to acquire new scan data by the imaging device. Moreover, applicant argues the selected slice image of Pieper is not the same as an operator defined plane as recited in the claims of the present invention. An operator of the Pieper patent is limited to the slice images that have already been acquire by the imaging device and is not able to define additional slice images that subsequently be added to the 3-D model. The Pieper system and method are not interactive with the imaging device, but only interactive with the 3-D computer model based upon existing data in a 2-D slice image database. The Pieper system does not provide how additional scan planes

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may be defined for subsequent acquisition. Also, applicant argues the changing the viewing angle of the object image does not define an image slice or an operator defined plane.

Upon further review of specification, and in light of applicant's arguments, the examiner respectfully disagrees for the following reasons. First of all, none of the claims explicitly recites limitations of the invention is related to so-called "visualization and interactive *pre-acquisition* definitions of scans". In fact, applicant in all independent claims recites the limitation of "acquiring one or more plane image of the subject", which clearly shows the preceding image process steps of "generating a 3-D model based upon the one or more plane images", "operation input defines an operator defined plane"... etc, are after the acquisition. Therefore, it would not be a pre-acquisition process. Second of all, the examiner would like to point out that independent Claim 1 nowhere recites limitation of "*interactive with the imaging device, and additional scan planes may be defined for subsequent acquisition*". In addition, with regard to the argument of "changing the viewing angle of the object image does not define an image slice or an operator defined plane", Pieper at column 10, lines 21-41, teaches a physician would like to view the 3-D model in different angles, once the desired image is found, the image will be displayed on an open window. The examiner interprets finding the desired image as defining an image plane because it requires the physician to define or find the desired image first before the image can be outputted to an open window.

4. Applicant's arguments with respect to claims 8 and 14 have been considered but are moot in view of the new ground(s) of rejection.

Applicant argues the limitation of “defining scan geometry determined by the operator with respect to the 3-D model for the imaging device to acquire additional image data” recited in Claims 8 and 14 are not taught or suggested by Pieper.

Upon further review of specification, and in light of applicant’s arguments, the examiner agrees Pieper does not teach defining scan geometry determined by the operator with respect to the 3-D model for the imaging device to acquire additional image data. Nonetheless, such technique is well known in the art. Accordingly, a new reference has been cited in the following office action.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1 and 6-7 are rejected under 35 U.S.C. 102(e) as being anticipated by Pieper (U.S. Patent No. 6,151,404).

- a. Referring to Claim 1, Pieper discloses an imaging device for acquiring one or more plane images of the subject (Pieper at column 4, lines 3-4, “teaches a plurality of 2-D slice images generated by scanning a structure”, and such scanning device is a CT scanner as described at column 6, lines 63-64); a 3-D model device, in communication with the imaging device, for generating a 3-D model based upon the one or more plane images acquired from the imaging

device (Pieper at column 4, lines 59-60, teaches “assembling an appropriate set of scanned 2-D images into a 3-D database”, and “extracting computer models of patient specific anatomical structures from the information contained in the 3-D database”. Note such computer models are 3-D models as described at column 3, line 50); an input device for receiving operator input (Pieper at column 9, lines 22-23, discloses his invention is implemented on with a computer, therefore the input devices are a mouse and a keyboard, which are the input devices 55 described in column 9, line 64), wherein the operator input defines an operator defined plane (Pieper at column 4, lines 8-10, teaches means for selecting a particular 2-D slice image. Also, see column 10, lines 2-3, generate the corresponding image of the scanned anatomical structure from the desired angle of view, such desired image is displayed in an open window as described at column 10, line 29), and wherein a scan model of the operator defined plane is incorporated into the 3-D model (Pieper at column 4, lines 15-18, teaches inserting the selected slice image into 3-D computer model. Note such selected slice image is a scanned image stored in first section 35, column 10, line 27), and a display for presenting the 3-D model, wherein the 3-D model includes the operator defined plane (Pieper at column 4, lines 20-24, teaches means for displaying an image of the augmented 3-D computer model, and the specific 2-D slice image incorporated in to the model), such that the operator can define an orientation of the operator defined plane in relation to one or more subject landmarks defined by the plane images acquired from the imaging device (Pieper

at column 10, lines 33-34, teaches “the physician can use input devices 55 to instruct the image rendering software as to the particular angle of view desired”).

- b. Referring to Claim 6, Pieper discloses wherein the imaging device is selected from one of the group consisting of a magnetic resonance imaging scanner and an ultrasound machine (Pieper at column 6, lines 63-64, teaches the scanning device is preferred to be a CT scanner, however, MRI and ultrasound device are applicable as well, column 1, lines 23-24).
- c. Referring to Claim 7, Pieper discloses wherein the input device enables the operator to alter the orientation of the operator defined plane in the 3-D model, such that the operator can interactively manipulate and view, via the display, the defined plane in the 3-D model to facilitate the determination of a desired operator defined plane (column 10, lines 1-10 and 36-41).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 8-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pieper in view of Cline et al (U.S. Patent No. 4,984,157).

- a. Referring to Claim 8, Pieper discloses storing image planes, acquired from an imaging device, as image data (Pieper: first section 35, column 7, line 63); transmitting the image data to a 3 dimensional model device, wherein the 3-D

model device constructs a 3-D model based on at least a portion of the image data (Pieper: 3-D computer model, column 7, line 62); displaying the 3-D model to an operator (Pieper: display 60, column 10, line 29); enabling the operator to manipulate the 3-D model to define an operator defined image (Pieper: column 10, lines 2-3, generate the corresponding image of the scanned anatomical structure from the desired angle of view), wherein the an object representing the operator defined image is presented with the 3-D model, such that the operator can determine the orientation of the operator defined image in relation to the one or more image planes acquired from the imaging device (such desired image is presented with the 3-D computer model). However, Pieper does not explicitly teach defining scan geometry determined by the operator with respect to the 3-D model for the imaging device to acquire additional image data. Cline at column 10, lines 45-58, teaches when the desired image is displayed with “zoom” affect, which requires higher resolution, the additional data values for the zooming area are generated. And the way of such data values are obtained are either by searching a stored array of values or by generating values by non-intrusive body scanning techniques, which is using CAT scanning or NMR imaging. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to defining scan geometry (the “zoom” affect) by the operator with respect to the 3-D model for the imaging device to acquire additional image data. One of ordinary skill in the art would have been motivated to do this because Pieper at column 10, lines 36-41, teaches manipulating the desired image in an

open window by move the view closer or further out, which is zoom effect as described in Cline by using the image data stored in first section 35, where Cline at column 10, lines 56-58, teaches when the stored values are not available, the values can be obtained by non-intrusive body scanning technique, which is using acquisition means, such as CAT scan or NMR imaging.

- b. Referring to Claim 9, Pieper discloses acquiring the operator defined image based upon input received from the operator (Pieper at column 10, lines 2-3, teaches the physician uses mouse to drag the computer model to change angle of view to find desired image view).
- c. Referring to Claim 10, Pieper discloses updating the 3-D model to include the operator defined image (Pieper at column 10, lines 59-64, teaches the user can define the plane as he desires, which the model will be updated accordingly).
- d. Referring to Claim 11, Pieper discloses querying the operator for input to enable the operator to define a new operator defined image to be generated (column 10, lines 57-58).
- e. Referring to Claim 12, Pieper discloses allowing the operator to manipulate the updated 3-D model (Pieper system allows physician to continue to manipulate the updated 3-D model after change the slice window display to a user-specified slice).
- f. Referring to Claim 13, Pieper discloses querying the operator for input to enable to operator to manipulate the object representing the operator defined image, such that the user can interactively manipulate the object representing the operator

define image in the 3-D model to facilitate the determination of a desired operator defined image (Pieper at column 10, lines 21-29, teaches manipulating the 3-D computer model to obtain a desired image).

- g. With regard to Claim 14, the only difference between Claim 8 and Claim 14 is Claim 14 calls for additional limitation of a computer program which Pieper discloses his system is implemented on a computer.
- h. With regard to Claim 15, the limitation is addressed in Claim 10.
- i. With regard to Claim 16, the limitation is addressed in Claim 12.
- j. With regard to Claim 17, the limitation is addressed in Claim 11.

Allowable Subject Matter

7. Claims 2-5 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

- a. Claim 2 defines features of comprising a scan geometry module that communicates with the input device to receive the operator input, wherein the scan geometry module generates scan geometry parameters representative of the operator input and communicates the scan geometry parameters to the imaging device such that the imaging device can acquire the operator define plane. These features in Claim 2 are not taught or suggested by the art of record.
- b. Claims 3-5 are dependent upon Claim 2.

Conclusion

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8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

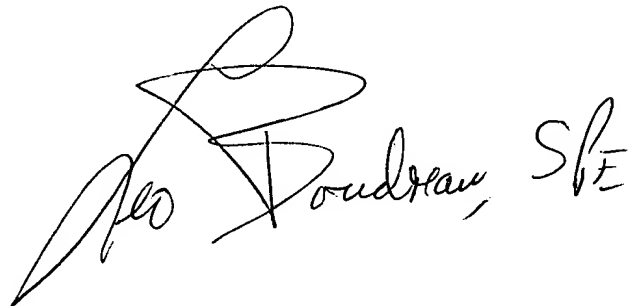
9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tom Y Lu whose telephone number is (703) 306-4057. The examiner can normally be reached on 8:30AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo H Boudreau can be reached on (703) 305-4706. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tom Y. Lu

A handwritten signature in black ink. The signature appears to be "Leo Boudreau, SPE". The "SPE" is written in a slightly larger, more formal script than the name. The signature is slanted to the right.